



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/693,254	10/24/2003	Donald Stuart Miller	1679.019	9091
23405	7590	10/04/2005	EXAMINER	
HESLIN ROTHENBERG FARLEY & MESITI PC 5 COLUMBIA CIRCLE ALBANY, NY 12203			MULLER, BRYAN R	
			ART UNIT	PAPER NUMBER
			3723	

DATE MAILED: 10/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

e

<b>Office Action Summary</b>	<b>Application No.</b> 10/693,254	<b>Applicant(s)</b> MILLER, DONALD STUART	
	<b>Examiner</b> Bryan R. Muller	<b>Art Unit</b> 3723	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 14 July 2005.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 17-31 is/are pending in the application.  
     4a) Of the above claim(s) 20,23 and 25 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 17-19,21,22,24 and 26-31 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 October 2003 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
     a) ☐ All    b) ☐ Some \* c) ☒ None of:  
         1. ☐ Certified copies of the priority documents have been received.  
         2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
         3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
     \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
     Paper No(s)/Mail Date 10/24/2003.
- 4) ☐ Interview Summary (PTO-413)  
     Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Election/Restrictions***

1. The applicant elected Species 1 without traverse in the reply filed on 10/15/2004 and acknowledged that claims 20, 23 and 25 do not read on the elected species, by emitting those claims from the applicants list of claims that do read on the elected species). In the reply filed on 7/14/2005, the applicant argues the withdrawal of claims 20, 23 and 25 because they are dependent on generic claim 17. This is not found persuasive because different claimed species commonly have linking generic claims, but the individual species may still be patentably distinct (see MPEP § 808.01a).
2. The requirement is still deemed proper and is therefore made FINAL, claims 20, 23 and 25 remain withdrawn.

### ***Specification***

3. The previous objections to the specification have been withdrawn.

### ***Claims***

4. The previous objections and rejections under 35 U.S.C § 112 have been withdrawn.

### ***Claim Rejections - 35 USC § 112***

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claim 26-28 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The preamble of claim 26 discloses a valve but the body of the claim discloses a container assembly comprising a cap, inlet means, riser tube and restricted bores, none of which are actually parts of the valve, therefore the valve does not appear to further limit the claim from which it depends. If the applicant intends to claim the entire system, including the container assembly, it would be advised to make claim 26 an independent claim, claiming the system or assembly and include all prior limitations of the valve, as claimed in the independent claim. Claims 27 and 28 also only provide limitations relating to the system and no additional structure to the valve.

7. Claim 29 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is unclear if claim 29 is intended to be dependent on claim 17 or if it is intended to be an independent claim. If the claim is intended to be dependent, it fails to provide any further structure for the valve (similar to claims 26-28) or if the limitation is intended to be independent, all limitations of claim 17 should be disclosed in the claim.

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 3723

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 17-19, 21, 24 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hehr (3,704,553) in view of Goodwin (3,419,220) and Keizers (5,283,991).

10. In reference to claim 17, Hehr discloses a nozzle control valve for sandblasting and like spraying apparatus that comprises at least two apertured valve seat means (50, 28' and 64), each said seat means having a contact face in contact with a corresponding opposing contact face of another said apertured valve seat means and being translationally slideable in contact therewith and with respect thereto between a first position in which the apertures of each valve seat means are aligned so that a pressurized carrier fluid is passable through said apertures, and a second position wherein the aperture in one valve seat means is blocked by the contact face on another to stop flow through the valve; said valve seat means being urged sealingly together by the pressure of the carrier fluid exerted on one valve seat means. The fluid in tube 30 is flowing in the direction of the valve and because the inner diameter of the tube is larger than the diameter of the aperture in the slideable seat, the pressure of the fluid against seat (50) will provide pressure in the direction of seat (28') and thus, urge the two seats sealingly together (although the valve provides other sealing means, the pressurized fluid will inherently provide pressure on the valve seat means that will press the valve seat means together and inherently increase the sealing pressure between valve seat

Art Unit: 3723

means, further aiding the other sealing means of the valve in ensuring a proper seal).

Hehr does not however disclose that the fluid is a liquid or that the valve seat means comprise a material with hardness, as measured on the Mohs scale, of at least 9.

Keizers discloses a sandblasting method that discloses a similar system to the one claimed by the applicant, wherein the carrier fluid is water (a liquid), teaching that it is well known in the art to use a liquid as a carrier fluid, and further discloses a foreign reference that teaches that the carrier fluid may be compressed water or alternatively compressed air. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made that the compressed air of Hehr may be replaced by compressed water. Goodwin provides a nozzle for use with abrasive-laden slurry and teaches the nozzle should be made of a material selected from a group that includes diamond for the purpose of providing the nozzle with characteristics of abrasion resistance and impact resistance to resist wear on the nozzle due to contact with the abrasive in the slurry col. 1, lines 55-67). Therefore, because the valve of Hehr is used to spray abrasive materials and thus directly contacting the abrasive particles, it would be obvious to one of ordinary skill in the art at the time the invention was made to make the valve seats of Hehr out of diamond, as taught by Goodwin, in order to protect the components of the valve from damaging abrasion and impact from the abrasive particles that would reduce the working life of the valve. Further, is taught as extrinsic evidence in the invention of Benner (2,318,360) that diamond is a hardness of 10 on the Mohs scale (col. 2, lines 12-13).

Art Unit: 3723

11. In reference to claim 18, the combination of Hehr, Goodwin and Keizers as discussed supra provides the valve of claim 17 and Hehr further provides that the flow of abrasive particles and carrier fluid passes to a valve seat means through a tube (30) adapted to allow sliding movement of the valve seat means and to transmit thereto a force urging the valve seat means together. The tube is adapted to connect to the valve structure in a way that the valve seat (50) may obviously be allowed to slide and the force that urges the valve seat means together is provided by the fluid flow within the tube as discussed supra.

12. In reference to claim 19, the combination of Hehr, Goodwin and Keizers as discussed supra provides the valve of claim 17 and Hehr further provides that at least two apertured valve seat means (50 and 28') comprise two valve seat means, one (50) being translationally slideable in contact with the other and with respect thereto.

13. In reference to claim 21, the combination of Hehr, Goodwin and Keizers as discussed supra provides the valve of claim 17 and that the valve seat means comprise diamonds.

14. In reference to claim 24, the combination of Hehr, Goodwin and Keizers as discussed supra provides the valve of claim 17 and Hehr further provides that the slide means to which one of the valve seat means is mounted, said slide means being adapted to be moveable translationally by external actuating means (by operator), thereby causing said one valve seat means to move between said first and said second positions.

15. In reference to claim 29, the combination of Hehr, Goodwin and Keizers as discussed supra provides the valve of claim 17 and Hehr further provides an apparatus for machining a work piece, comprising pressurizing means (air compressor – col. 2, line 15, which would inherently be replaced by water pump or compressor in view of Keizers), a storage vessel (10 in figure 4) for a supply of abrasive particles, a nozzle (28), and a valve of claim 17 adjacently upstream of the nozzle (46 in figure 1), adapted to interrupt flow through the nozzle.

16. Claims 17 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hehr (3,704,553) in view of Keizers (5,283,991) and Kyoto-shi (EP 0884509 A1).

17. The obvious combination of Hehr and Keizers, as discussed supra disclose the valve for control abrasive flow in a carrier liquid, but again fails to disclose that the valve seats comprise a material with a hardness of 9 on the Mohs scale. Kyoto-shi discloses a disc valve that provide two valve bodies which slide with each other wherein at least one of the valve bodies is made of ceramic and the surface of the body is coated with a diamond-like carbon (abstract, lines 7-11) to enhance adhesion forces and to maintain a leak free and stable sliding characteristic for an extended period of time (abstract, lines 1-6). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to provide surfaces of the seat means of the invention of Hehr made out of ceramic with a diamond-like hard carbon (or to replace the carbon with actual diamond to provide the same desired results) film in order to enhance adhesion forces to maintain a leak free and stable sliding characteristic for an extended period of



time. Thus, the valve seat would comprise a composite diamond/ceramic material and it can be assumed that the hard carbon would have a Mohs hardness of approximately 10 because it is diamond-like.

18. Claims 26-28 rejected under 35 U.S.C. 103(a) as being unpatentable over Hehr ('553) in view of Goodwin ('220) and Keizers (5,283,991) and further in view of Shipman (4,569,161).

19. In reference to claim 26, the combination of Hehr, Goodwin and Keizers as discussed supra provides the valve of claim 17 and Hehr further provides a container (10) that contains an abrasive that is to be distributed through fluid pressure but Hehr does not disclose any kind of metering apparatus for metering the abrasive supply to the nozzle. Shipman provides a pneumatic powder metering device for abrasive jet machining that comprises a container (10) for abrasive particles closeably sealed by a cap (12), said cap comprising an inlet (20) means connected to a riser tube (26) within the container, each of such restricted bore as substantially to prevent flow therethrough, except under an imposed pressure differential, and an outlet means (18), the bore of which comprises such a restriction as substantially to prevent flow therethrough, except under an imposed pressure differential. Shipman discloses that the feed supply orifice (outlet) is a small diameter (col. 2, line 37) and that no powder will flow through orifice 18 until the valve is actuated (col. 2, lines 54-56) causing an imposed pressure differential. It is also disclosed by Shipman that the inlet (20) and riser tube (26) are present to transmit pressurized air to the container to equalize pressure within the

container (col. 2, lines 46-50), thus there would be no air flow through the riser tube or inlet, except under an imposed pressure differential. Shipman finally teaches that his invention provides an improved powder throttling mechanism for precisely metering powders in abrasive jet machining processes and automatically adjusts powder flow to provide proper proportions of powder (col. 1, lines 49-54). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to replace the container and powder supply apparatus of Hehr with that of Shipman to provide proper proportions of abrasive powder to the pressurized fluid of Hehr in order to prevent wasted abrasive (which would be costly) and to produce the proper amount of abrasive for optimal fluid jet machining.

20. In reference to claim 27, Hehr discloses a container that contains a supply of abrasive particles suspended in a carrier fluid and Shipman discloses a similar container that contains a supply of abrasive particles suspended in air. Again, as taught by Keizers, it would be obvious that the compressed air of Hehr and Shipman may be replaced by compressed water, as discussed supra.

21. In reference to claim 28, the obvious combination of Hehr, Goodwin, Keizers and Shipman, as discussed supra provides a valve with a system for supplying abrasive particles in a liquid carrier and Shipman further discloses that aluminum oxide is a common abrasive used in sandblasting (col. 1, lines 33-35 in background). Therefore, it would further be obvious to use aluminum oxide as the abrasive because it is old and well known in the art.

***Allowable Subject Matter***

22. Claims 30 and 31 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Response to Arguments***

23. The applicant argues that the pressure of the fluid in the Hehr reference does not urge the valve slide into the inner end of the nozzle. As discussed supra, even though the valve of Hehr does have other sealing means, the pressure of the fluid will inherently urge the valve slide towards the end of the nozzle, which will inherently increase contact pressure and improve the seal between the members.

24. The applicant further argues that substituting liquid for air in the Hehr reference would render the apparatus inoperable because liquid is incapable of being compressed and stored in a container. However, as discussed supra, it is common and well known in the art that compressed fluid (such as water) is commonly used as a carrier fluid and further the carrier fluid of Hehr is not stored compressed in the tank, it is supplied by line 16 and builds up pressure in the tank, which water is also capable of doing.

25. The applicant further argues that the Goodwin reference does not teach the use of diamonds on the valve seat means and that the specific examples of the Goodwin reference teach away from such a configuration. The examiner agrees that Goodwin does not provide any examples of multiple valve seats that are diamond coated, but the lack of a specific example does justify that the reference teaches away from the claimed

Art Unit: 3723

invention. The Goodwin reference specifically cites diamond as a material that may be applied to the exit section of the Goodwin nozzle because it has great abrasion resistance. The examiner merely is using the teaching of Goodwin to treat portions of sandblasting apparatus that come in contact with the high velocity abrasives with a protective coating such as diamond, and it is further obvious to coat all surface that do contact the high velocity abrasives, including the valve seats.

26. Finally, the applicant argues that the Kyoto-shi reference does not disclose materials with a hardness of greater than 9 and that it does not disclose two or more of the sections of the nozzle fabricated from a material having a hardness of at least 9. Kyoto-shi discloses a ceramic and diamond-like carbon (or diamond) and as claimed the valve seat *comprises* a material with a hardness of at least 9. The use of the term "comprises" means that the valve seats include a material with a hardness of at least 9 but may have contain other materials as well. Thus the combination of Hehr and Kyoto-shi to make the valve seats of a ceramic/diamond material reads on a material that *comprises* a material having hardness of at least 9. Further, Kyoto-shi discloses that "at least" one surface has a ceramic/diamond coating, implying that more than one surface may be coated, thus Kyoto-shi discloses that two or more of the valve seats may be coated with the ceramic/diamond material.

### ***Conclusion***

27. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Pickard (5,605,497) and Schachter (3,626,841) disclose

containers and inlet/outlet structures similar to those disclosed by applicant and Carpenter (3,629,976) discloses a valve similar to that disclosed by applicant.

28. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bryan R. Muller whose telephone number is (571) 272-4489. The examiner can normally be reached on Monday thru Thursday and second Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph J. Hail III can be reached on (571) 272-4485. The fax phone

Art Unit: 3723

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

BRM *BRM*  
9/29/2005



Joseph J. Hail, III  
Supervisory Patent Examiner  
Technology Center 3700